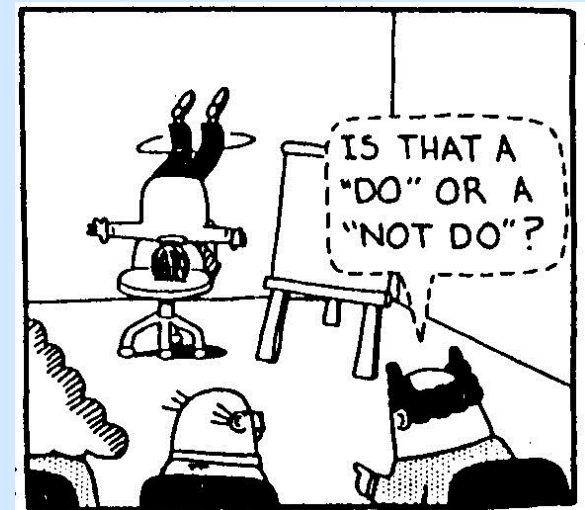


What do you think of When You Hear the Term

Fall Protection?



Fall Protection

Self-Study Course & Exam



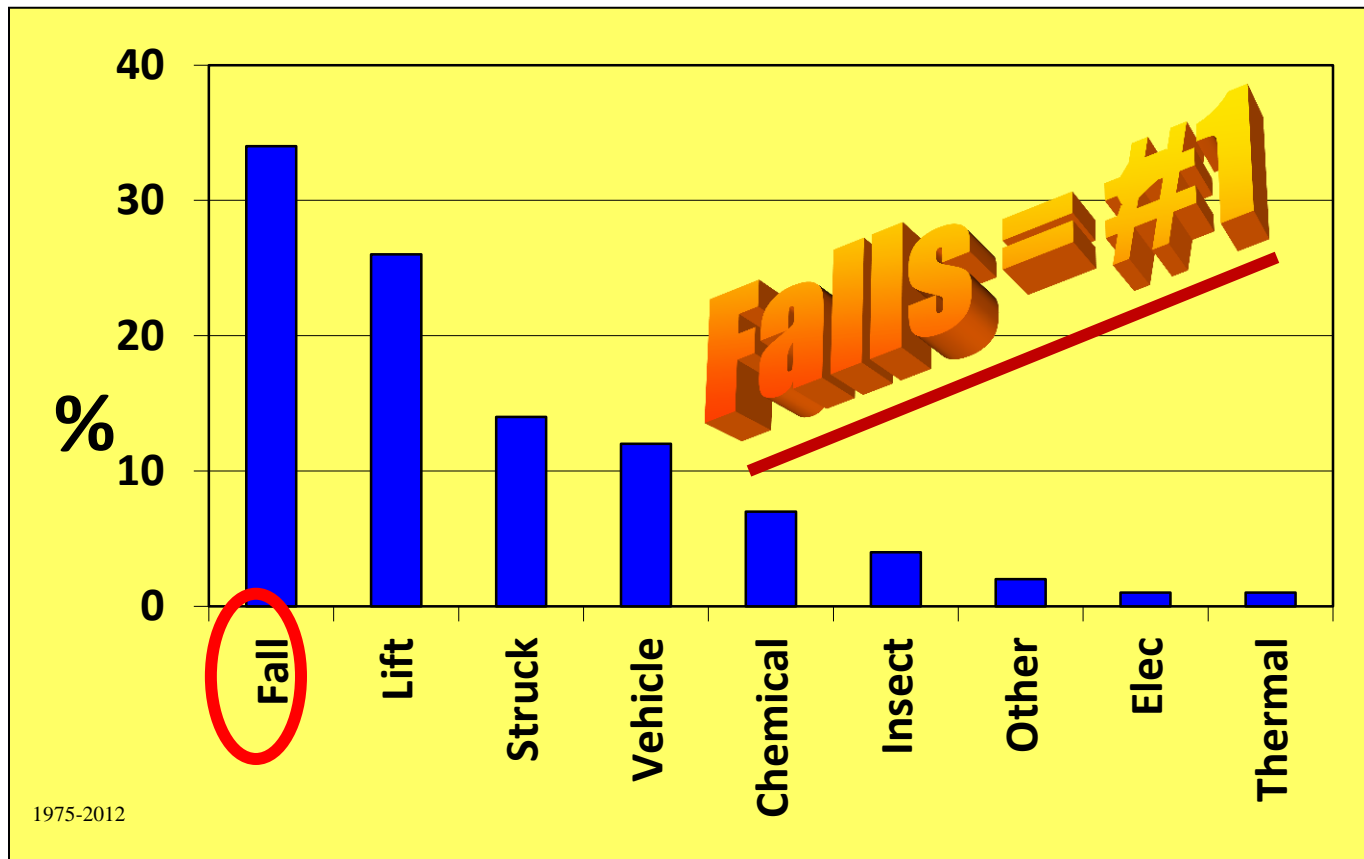
To Receive Credit For This Course
Contact The Safety Office For A Test
Or Print A Copy From On-Line
Passing Grade is **70%** Or Better

Note: Many Exam Questions Can Be Found In This Presentation But Not All.
You Will Also Need To Refer To The **Fall Protection Policy** Found On Safety's
Webpage. **Ladder Safety** And **Scaffold Safety** Are Additional But Separate
Courses Associated With This Fall Protection Course.

Safety Program

General Services Division
Facilities Management

Types of Accidents (In Our Organization)



Our Problem:

How to Stop



FALLS

Safety Program

General Services Division
Facilities Management

Slip



When there is too little friction or traction between your feet (footwear) and the walking or working surface, and you lose your balance.

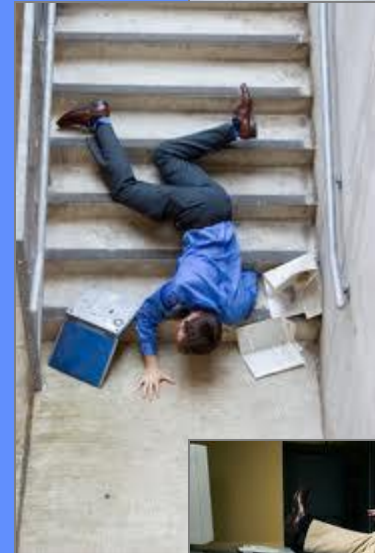
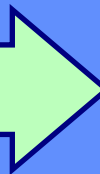


Trip



When your foot (or lower leg) hits an object and your upper body continues moving or you step down unexpectedly to a lower surface, i.e., stepping off a curb or misstep on a stairway, and you are thrown off balance.

Can lead to:



Fall

Occurs when you are too far off your center of balance and can no longer sit or stand.

RESULTS of **Fall Accidents**



- Injuries To Hands, Wrists, Arms, Ankles, Knees, Back, Head
- Medical Costs
- Time To Recuperate
- Time Away From Work
- Temporary/Permanent Disability
- Restricted Work
- Decreased Productivity
- Increased Insurance Premium



Safety Program

General Services Division
Facilities Management

COSTS for a FALL



QTY	ORGANIZATION	PAID CLAIMS *
14	Internal Operations	\$70,070
12	GSD FM Building Maintenance	\$164,904
7	Human Resources – TEMPO	\$42,917
6	Division of State Information Technology	\$7,030
3	GSD FM Custodial	\$7,129
1 each	Confederate Relic Room	\$35
	GSD FM Building Systems	\$521
	GSD Surplus Property	\$382
	GSD Interagency Mail Services	\$25,285
	GSD Administration	\$50
	GSD FM Parking	\$1,480
	GSD FM Administration	\$1,530

In 5 year Study - \$331,333
(2007 – 2012)

1975 - 2012*

\$1,535,540

Largest Claim

\$364,793

(1975)

Average Claim

\$7,099

* Source - State Accident Fund

CAUSES **Fall Accidents**



%	CAUSE
18%	STAIRS
16%	FLOOR – Wet / Icy
5% each	FLOOR – Foreign Object LADDER
4% each	CHAIR – Getting In / Out CURB / PARKING CURB / SPEED BUMP FLOOR – Other UNEVEN WALK SURFACE
2% each	VEHICLE – Getting In / Out MATERIALS HANDLING – OFF BALANCE
1% each	IMPROPER PRODECURE CLOTHING ELEVATOR MALFUNCTION DOOR THRESHOLD ILLNESS

Don't



FALL

For It !!!

PREVENTING Fall Accidents YOUR ACTIONS



PAY ATTENTION – Watch Where You Are Going

- **Adjust Stride** *When There Is A Change In Walk Surface*
(Between Carpet , Vinyl, Ceramic, Marble, Stone Flooring)
 - *Slow Down* And *Take Shorter Steps*
 - Point Your Toes Slightly Outward
 - Make Wide Turns At Corners



PREVENTING Fall Accidents YOUR ACTIONS

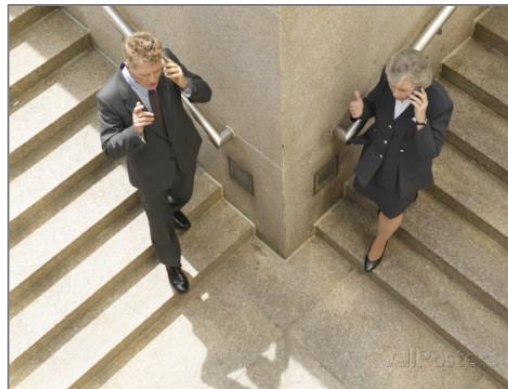


PAY ATTENTION –

Watch Where You Are Going

Avoid ***DISTRACTIONS !!!***

- Cell Phone
- Texting
- Talking



PREVENTING **Fall Accidents** **YOUR ACTIONS**



PAY ATTENTION – Watch Where You Are Going

Use Walkways

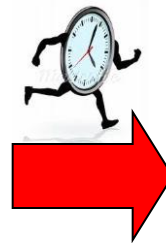


Instead Of Shortcuts
(Across Uneven Ground)

PREVENTING Fall Accidents YOUR ACTIONS



Take Your Time – Don't Hurry, Rush Around, Move Too Fast For Conditions



PREVENTING **Fall Accidents** **FLOORS**



Clean Up Clutter In Work Areas, Aisles & Walkways

- Sweep; Put Away Tools, Equipment & Storage
- Close Drawers

Keep Floors Clean



PREVENTING Fall Accidents FLOORS



Clean Up Spills

- Use Wet Floor Signs
- Use Absorbent For Oil / Grease



PREVENTING **Fall Accidents** **FLOORS**



Power Cables

- Do Not Route Across Walkway Or Under Rugs
- Use Cable Protector



PREVENTING Fall Accidents FLOORS



**Report Damaged Walkways
For Repair**



**Worn, Loose Or
Wrinkled Carpet,
Mats & Runners**



**Uneven
Sidewalks**



Broken Stair Tread



Safety Program

General Services Division
Facilities Management

PREVENTING **Fall Accidents** **FLOORS**



Put **Non-Slip Floor Mats**
At Entrances When There Is
Rain, Snow Or Ice...



and
Wet Floor Signs
Until Dry

PREVENTING Fall Accidents SHOES



Taps on Soles



Slick Smooth-Surfaced Soles



High Heels

Footwear That Reduces Traction Is Not Suitable

PREVENTING **Fall Accidents** **SHOES**



SOLES And HEELS Should Be SLIP RESISTANT

- Leather Soles Are Good For Most Environments
- Soft Rubber Is Not Good For Wet Or Greasy
- Hard Rubber Is Good For Greasy Surfaces
- PVC Or Polyurethane Is Best Around Chemicals Or Petroleum Products
- Deep Tread Is Best For A Lot Of Water
- Clean Off Dirt, Mud, Grease, Oil



PREVENTING **Fall Accidents** **STAIRS**



Ensure Stairs Are Well Lighted



Do Not Store Items
On Stairs

PREVENTING **Fall Accidents** **STAIRS**



- **Use The Hand Rail**
 - For Stability
 - And To Help Pull Yourself Up The Stairs
- **Take One Step At A Time**



PREVENTING **Fall Accidents**

Carrying Oversized Or Too Many Objects:

- Obstructs Your View
- Impairs Your Balance
- Keeps You From Holding Onto Handrails

INSTEAD:

Use **Hand Truck, Dolly, Cart**
And / Or **Elevator** To Carry Large
Number Or Heavy Packages

- See Where You Are Going
- Prevent Hurting Your Back



PREVENTING Fall Accidents

**Watch For Changes
In Elevation**



Curbs



Sidewalks



Speed Bumps

PREVENTING Fall Accidents VEHICLES



When Mounting Or Climbing Down From A Vehicle:

- Have A Good Hand Hold
- Pull Yourself Up / Let Yourself Down
 - Reduces The Force Between Your Shoe And The Step Thus Reducing The Chances Of A Slip



Practice The “Three-point” Climbing Method

- Two Hands And A Foot Or Two Feet And A Hand Always In Contact With Vehicle Step



PREVENTING **Fall Accidents** **LADDERS**



Climb Using The “Three-point” Method

- Two Hands And A Foot Or Two Feet And A Hand Always In Contact With The Ladder
- Do Not Carry Tools / Materials While Climbing

Do Not Over-reach



**Put Up Ladder
At 4-to-1 Angle**

**Falling Off Of Ladders
Is As Easy As . . .**



1



2



3

PREVENTING **Fall Accidents**



Fixed Ladder Safety



**Ladder
Safety System**



**Ladder
Cage**

Fixed Ladders >20' Long Need:

- A Ladder Safety System
 - Allows Only a 9" Fall Distance
- Or Cages



Fixed Ladders >30' Long Need
Platforms

- Every 30' In Height Or
- Every 20' In Height When There Is No Ladder Safety System Or Has No Cages

PREVENTING Fall Accidents



LADDER SAFETY

Will Be Discussed More
In A Separate Course
Presentation



PREVENTING **Fall Accidents**



**For Most Employees
This Concludes The
General Information
On Preventing Falls**

Reminder
Take Your Test



**Trades Specialists And
Other Designated
Employees**

CONTINUE
To Part II



Division of General Services

FALL

PROTECTION

PROGRAM



FALL PROTECTION



- Osha Required Systems
- Operations
- Inspection & Maintenance
- Planning For A Fall
- Rescue
- Other Fall Situations



FALL PROTECTION

OSHA STANDARDS

Construction Industry - 29 CFR 1926

- Scaffolds
- Certain Cranes & Derricks
- Steel Erection In Building
- Certain Tunneling Equipment
- Electrical Transmission & Distribution
- Stairways & Ladders
- All Other Fall Situations

SUBPART

L
N
R
S
V
X
M



Require Fall Protection To Be Provided At 6' And Above

General Industry - 29 CFR 1910 Subparts M & D

- **Require Fall Protection To Be Provided At 4' And Above**
- **At Any Height When Working Above Dangerous Equipment / Machinery**



FALL PROTECTION - OSHA

Falls are the Leading Cause of Worker Fatalities in the U.S.

- 212,760 Workers Seriously Injured & 605 Killed
- \$70 Billion in Workers Compensation And Medical Costs

OSHA Standards Establish Systems and Procedures that:

- Prevent Employees from Falling Off, Onto or Through Working Levels
- Protect Employees from being Struck from Falling Objects
- Covers Workers
 - Exceptions For Inspectors, Investigators & Assessors



FALL PROTECTION

OSHA - REQUIRED SYSTEMS

FALL HAZARD

**DO NOT START WORK
UNLESS GUARDRAIL,
SAFETY NET OR
PERSONAL FALL ARREST
SYSTEM IS IN PLACE**

Guardrails



Personal Fall Arrest

Nets



FALL PROTECTION OSHA - REQUIRED SYSTEMS

Other Means Of Access:

- Scaffolds
- Aerial Lifts / Bucket Trucks
- Ladders

Each Also Requires
Fall Protection (Measures)



FALL PROTECTION HOLES

Holes In The Walk Surface Require

- Covers
 - Secured & Marked
 - Support Intended Load
 - <1" Tall With <30° Edges
- Guardrails
- Screens



FALL PROTECTION GUARDRAIL SYSTEM



WALKING/
WORKING
SURFACE

Top Rail:

- 42" +/- 3"
- 200 Lbs Side Force

Mid-Rail:

- Half Way
- 150 Lbs Side Force
- 19" Object Not Pass Through

Toe Board

- Withstand 50 Lbs Force
- No More Than 1/4" Above Work Surface

Post Spacing – 8' Apart

FALL TO
LOWER LEVEL

≥ 4 Ft

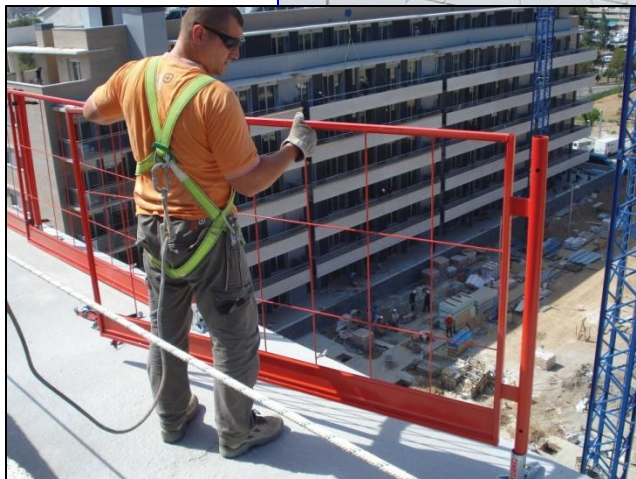
FALL PROTECTION GUARDRAIL SYSTEM

Safety Railings Can Be:

- A Permanent Installation
(Anchored / Roof Penetration)
- Or Temporary
(Non-Anchored / No Roof
Penetration)



FALL PROTECTION GUARDRAIL SYSTEM



- When Not In Use, Openings For Ladders Or Hoist Accesses Must Have In Place:

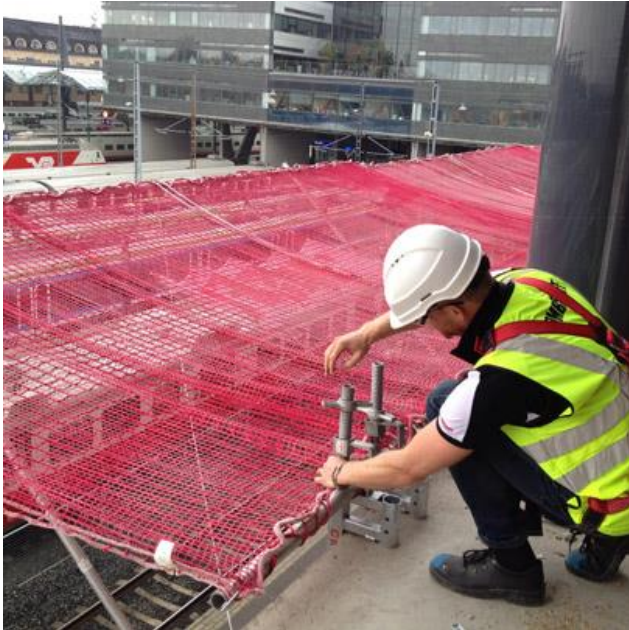
- Chain
- Gate
- Or Removable Guardrail

- Workers Who Could Lean Out Over Edge Must Have Personal Fall Arrest System

FALL PROTECTION NET SYSTEM

Fall Nets Must Be:

- As Close As Possible To Work Surface But Not More Than 30' Below
- Extend Out 8' – 13' (Depends On Fall Distance)
- Mesh Opening Not More Than 6" x 6"
- Must Support At Least 5,000 Lbs & A 400 Lb Object Falling 42"
- Remove Objects In Net ASAP At End of Shift



**Nets Are Not Practical For
Most Bldg. Maintenance Jobs**

FALL PROTECTION RESTRAINT DEVICES



Prevents The User From Potential Falls, Ie., Allows One To Work Up To Unprotected Edge But Does Not Allow To Fall Over The Edge



Adjustable Lanyard

FALL PROTECTION RESTRAINT DEVICES



BODY BELT

- Concentrates Full Force Of Fall On Abdomen Greatly Increasing Chance Of Internal Injuries
- Improper Wear Results In Further Injury
 - Too Low - Hang Upside Down
 - Too Loose - Belt Jerked Off
 - D-Ring Not In Back - Spinal Injury

Therefore,

**BODY BELTS ARE
PROHIBITED WITH FALL
ARREST SYSTEMS**

FALL PROTECTION POSITIONING DEVICES



Designed To Hold The Worker In Place At Height

- Allows Hands Free To Work
- Full Body Harness* With D-Ring & Snaphook Connectors
- Not Designed For Fall Arrest (Cannot Fall > 2')
- Need To Use With Personal Fall Arrest System

* Though OSHA Allows A Body Belt With Fall Positioning Work,
DGS Employees Are To Use A FULL BODY HARNESS With Side D-Rings
(As A Body Harness Is Applicable To All Fall Situations And Provides The Better Fall Protection)

FALL PROTECTION

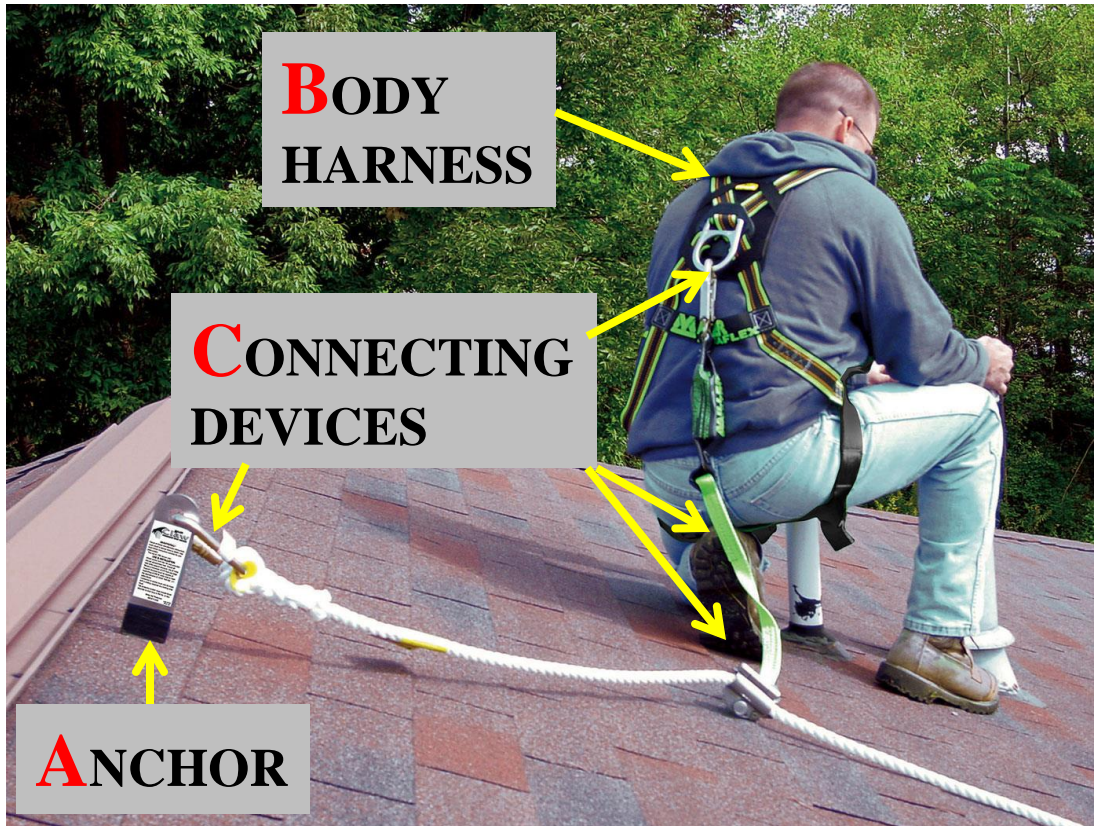
PERSONAL FALL ARREST SYSTEM



PARTS:

- **A**nchor
- **B**ody Harness
- **C**onnectors
 - D-Ring
 - Carabineer
 - Lanyard

Fall arrest systems are designed to stop a person's fall and absorb the impact to make the fall survivable



FALL PROTECTION

PERSONAL FALL ARREST SYSTEM



Shock Absorbing
Lanyard



Self Retracting
Lifelines



Rope & Cable
Grabs



Carabiners

Cross-Arm
Strap
Anchor



Full
Body
Harness



FALL PROTECTION

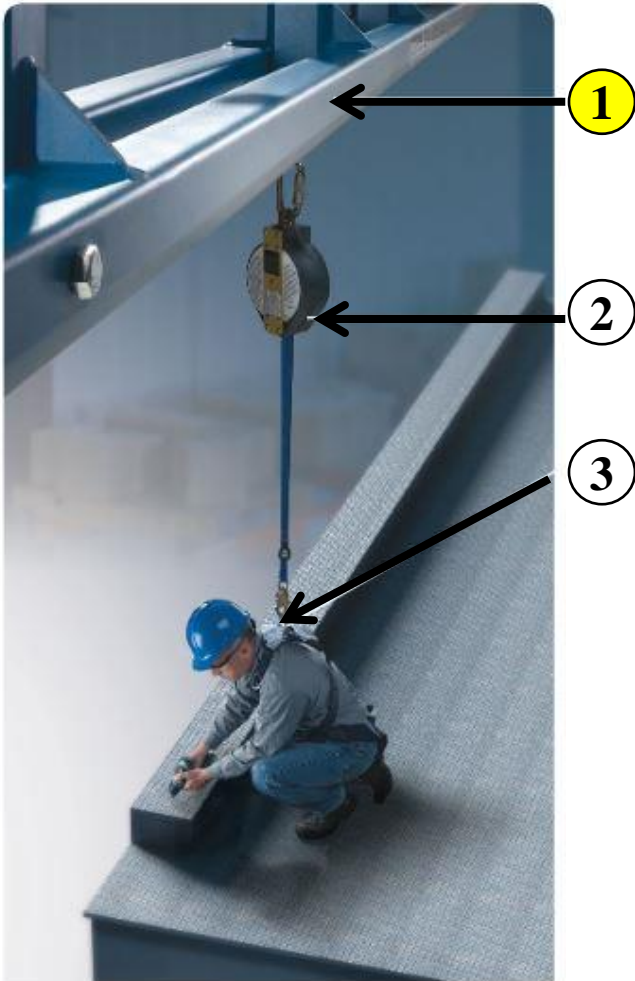
PERSONAL FALL ARREST SYSTEM



PARTS:

1. Anchorage – A Secure Point Of Attachment For Lifelines, Lanyards Or Deceleration Devices. Commonly Called A Tie-Off Point.

- Must Be A Fixed **Structural** Component Such As A Beam, Girder, Column Or Floor (i.e., Not A Guardrail) To Support the Fall Arrest Forces Exerted In A Fall
- Must Support 5,000 Lbs Per Worker



FALL PROTECTION

Anchorage Connectors



Horizontal Lifeline



Vertical Lifeline
(Rope Grab System)



D-Bolt
Anchors



Mounted
D-Ring

Permanent Installation

I-Beam Trolley



Hook
Anchor



Portable
Concrete
Anchor



Beam
Anchor



Cross
Anchor
Strap

Temporary Installations

FALL PROTECTION

PERSONAL FALL ARREST SYSTEM



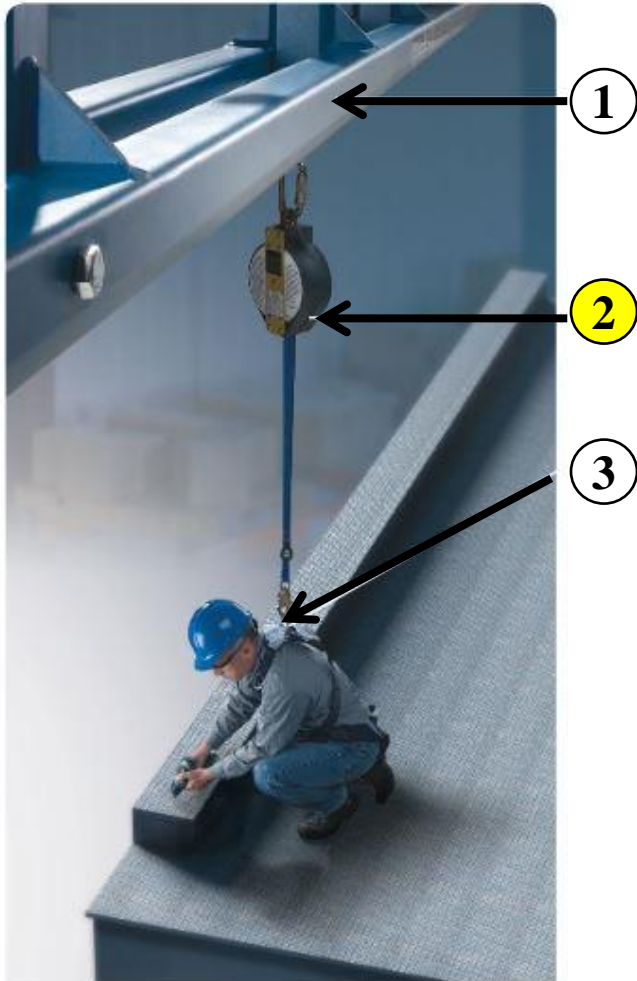
PARTS:

2. Connecting Device – Used To Link The Body Support (Harness) To The Anchorage Such As A:



Lanyard With A Shock Absorbing Device

Or A Self-Retracting Lifeline With Brake



FALL PROTECTION

PERSONAL FALL ARREST SYSTEM

Regardless The Lanyard Material, A **Deceleration Device** (i.e., A **Shock Absorber** Or **Brake**) Is Required For Fall Protection When There Is A Potential Risk To Fall Over An Unprotected Edge To a Lower Level More Than 4' Below



- Lanyard Is Folded And Stitched
- During A Fall The Stitch Is Ripped Which Slows Descent (Using Time And Distance) To A Survivable Fall

↑
Rip-Stitch Absorber Pack
↓



Nylon Web
Lanyard →

Nylon Rope



Steel Cable



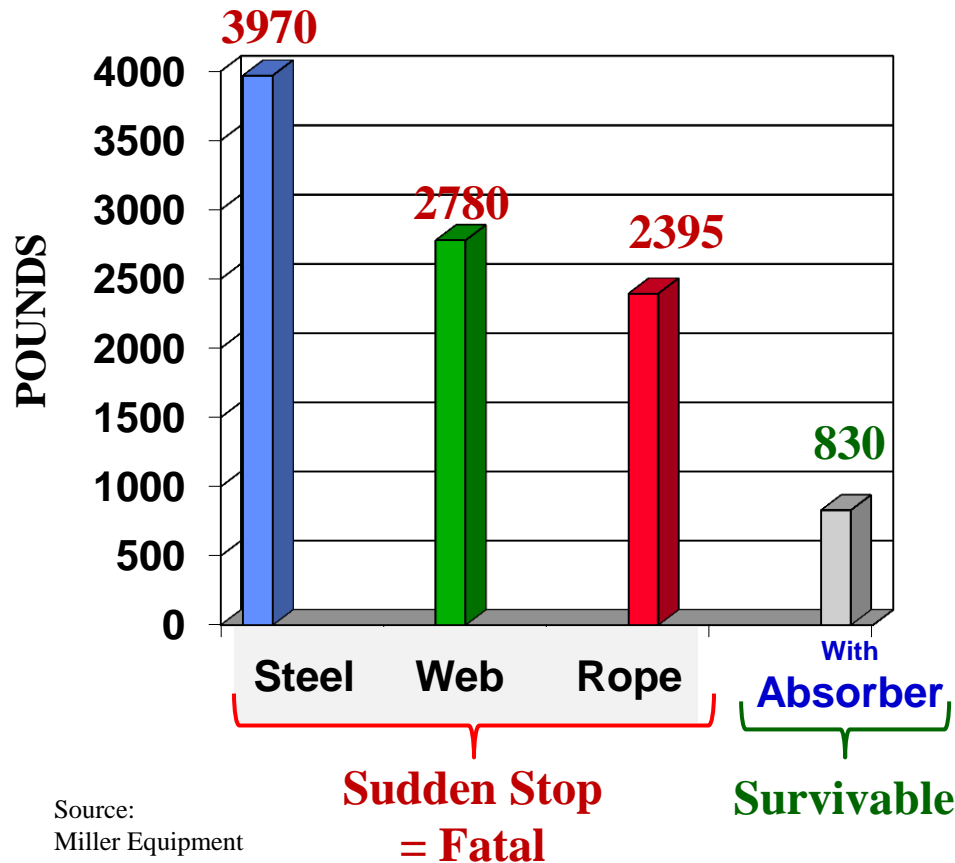
Stretch



PERSONAL FALL ARREST

PEAK FORCES

For Various Lanyard Materials



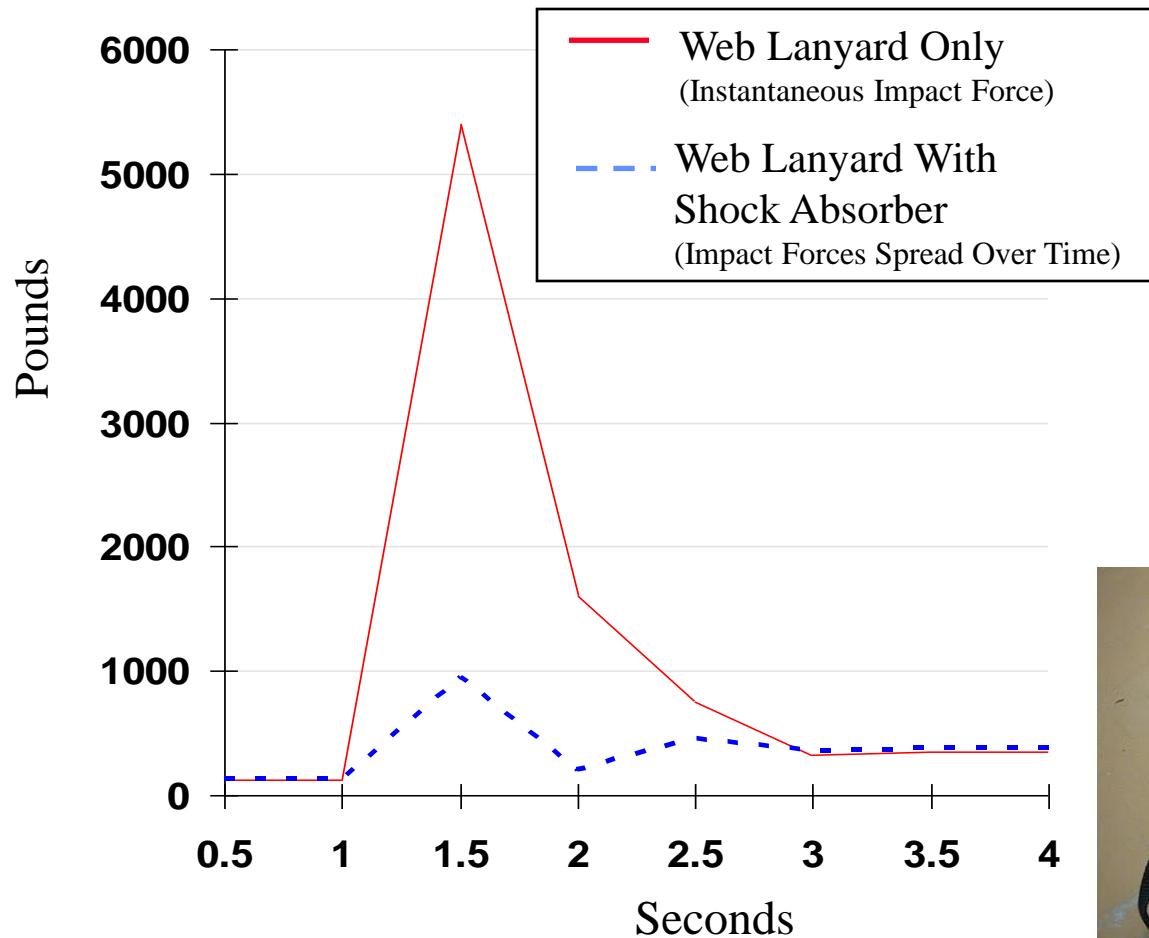
When A Person Free-falls, The Body Quickly Builds Up Forces On The Body. The Longer The Fall The Greater The Forces.

The Maximum Amount Of Force A Person's Body Can Withstand In A Fall Is 1,800 Lbs. Falls Using Lanyards Alone Can Be Fatal.

Fall Arrest Lanyards Are 6' Long Or Less And Have Decelerator Devices (Absorber) To Keep Fall Forces Under This Amount.

PERSONAL FALL ARREST

PEAK FORCES



Source: DBI / SALA



FALL PROTECTION

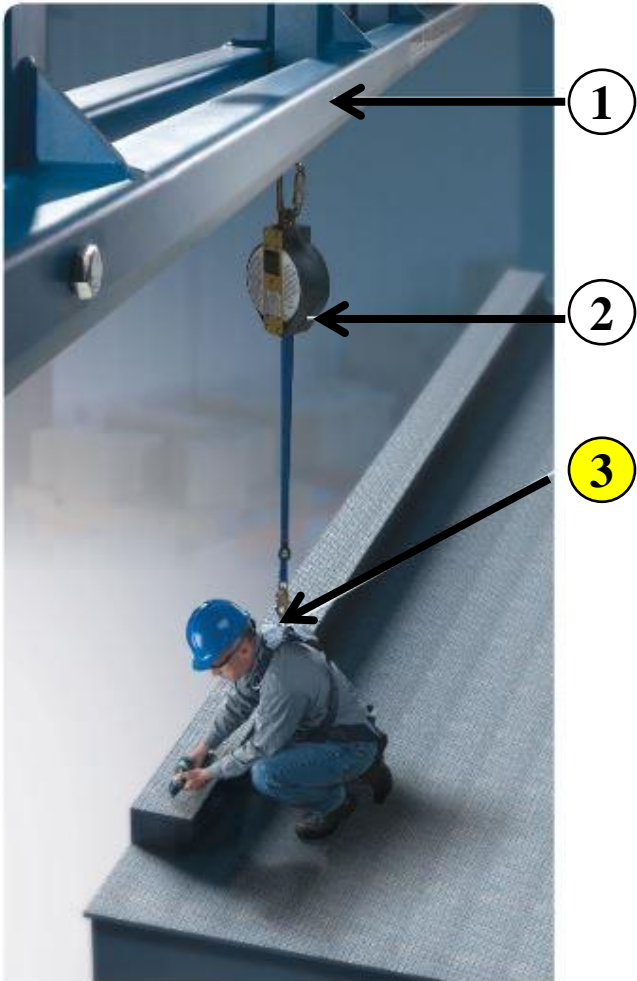
PERSONAL FALL ARREST SYSTEM



PARTS:

3. Body Harness – A Body Support Device That Distributes Fall Arrest Forces Across The Entire Torso

- Has A D-Ring Attachment In The Center Of The Back For Connection To The Fall Arresting Device



PERSONAL FALL ARREST

FULL BODY HARNESS



- A Series of Straps Designed to Retain the User in a Fall
- Keeps The User in an Upright Position
- Distributes a Fall's Impact Forces Throughout the Thighs, Buttocks, Chest and Shoulders

HOW TO DON A FULL BODY HARNESS



Step 1 - Hold harness by back D-ring. Shake harness to allow all straps to fall in place. If chest, leg and/or waist straps are buckled, release straps and unbuckle at this time.

Step 2 - Slip straps over shoulders so D-ring is located in middle of back between shoulder blades.

Step 3 - Pull leg strap between legs and connect to opposite end. Repeat with second leg strap. If belted harness, connect waist strap after leg straps

Step 4 - Connect chest strap and position in midchest area. Tighten to keep shoulder straps taut.

Step 5 - After all straps have been buckled, tighten all buckles so that harness fits snug but allows full range of movement. Pass excess strap through loop keepers.

HOW TO DON A FULL BODY HARNESS



The Back D-Ring Should Be Between Your Shoulder Blades



Connect All Chest, Waist And Leg Straps & Adjust For A Snug Fit

Types Of Harness Buckles



Quick-Connect



Pass-Thru



Tongue



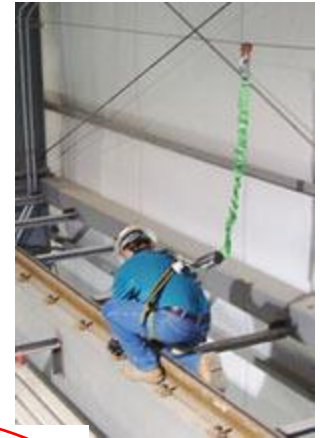
Friction

PERSONAL FALL ARREST LIFELINES

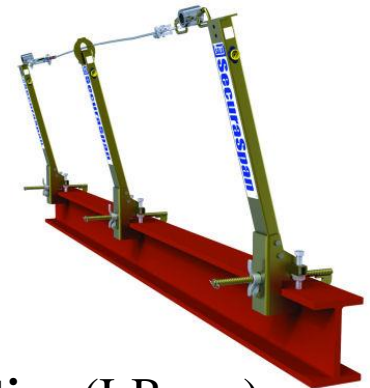
HORIZONTAL LIFELINE SYSTEM



Anchors



- A Safety Line Connected To 2 Or More Anchor Points
- Typically Designed To Support **1** Or **2** Workers
 - Must Support 5,000 Lbs. Per Person
- Permanent Or Temporary Installations Available



Construction (I-Beam)

PERSONAL FALL ARREST

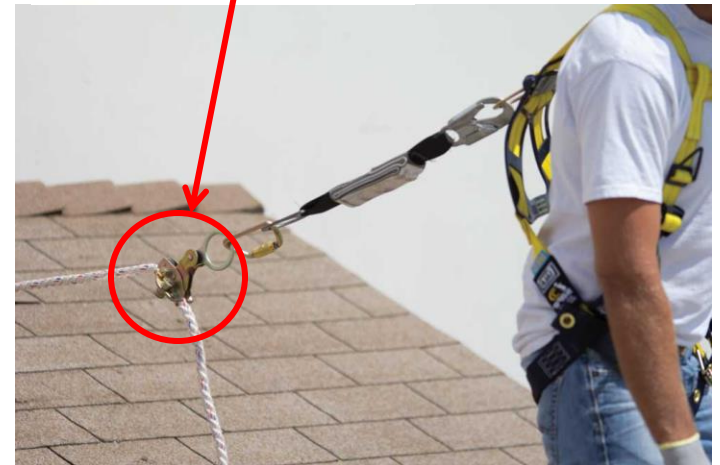
LIFELINES

VERTICAL SYSTEM

- A Rope Or Cable Lifeline Connected To A Single Anchor Point And Weighted Or Tied On The Bottom
- Used For Climbing And Descending
- When The Rope Grab Connector Is:
 - Unlocked - Slides Up/Down Rope
 - Locked (When Fall) - “Grabs” Rope
- Rope Must Reach The Next Lower Level Or To The Ground, Or Extend At Least 12’ Below Lowest Point For The Rope Grab
- **Each Person Must Have Their Own Vertical Lifeline**



Rope Grab
Attached To
Vertical Lifeline



Rope Grab



1. Remove Pin



2. Open Door



3. Insert Rope



4. Close Door

Lanyard with Shock Absorber

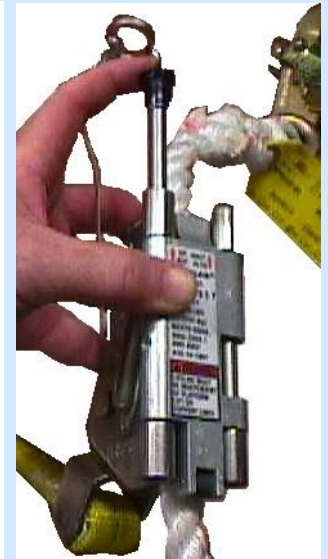
Snap Hook for Anchorage



Lifeline

Rope Grab

Weight



5. Reinsert Pin

Rope Grab - Operation

Up ↑ =
Unlocked



Unlocked
Device Travels
Up / Down Freely

Down ↓ =
Locked



i.e., When You Fall
The Grab Will Lock

Locked
Stops Fall in 2' or Less

PERSONAL FALL ARREST

SELF-RETRACTING LIFELINE

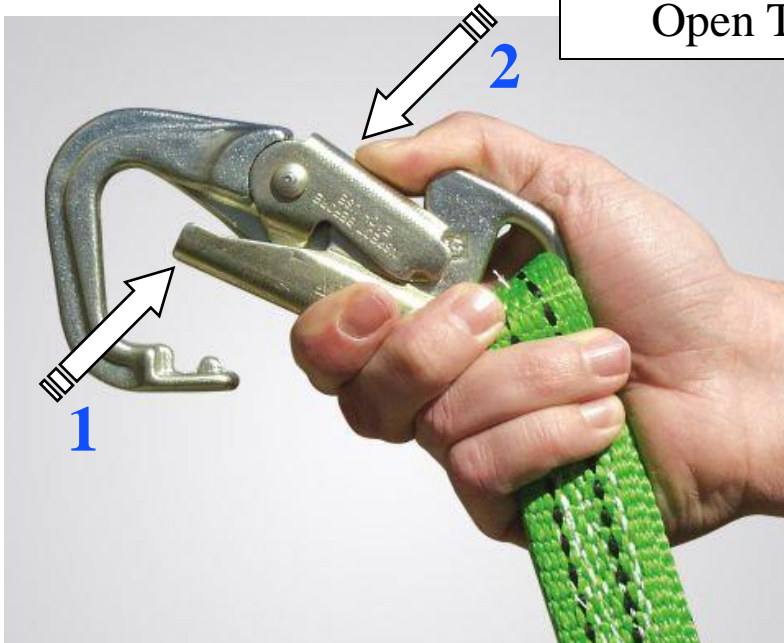


- Extends and Retracts Enabling the Worker to Freely Move About (Length - 10' to 130')
- Speed Sensing Brake Activates During a Fall
 - Stops Fall in 2' or Less
 - Reduces Impact Forces to 900 Lbs or Less
- Some Models Are Personal & Lightweight



PERSONAL FALL ARREST CONNECTORS

- 1 - Push Open The Keeper
- 2 - Must Push Unlocking Mechanism Before Can Open The Keeper



Double-Action (Locking) Snaphook

(Required For Fall Arrest Protection)

1

**PROHIBITED
For Fall Arrest**

Single-Action Snaphook (Non-Locking)

A Fall Could Cause Unintentional Loading
On The Keeper So The Snaphook Can
Roll Out Of Its Attachment

PERSONAL FALL ARREST CONNECTORS



DO NOT
Hook A Lanyard Back Onto Itself
Or
Wrap A Lanyard Around A Beam

This Reduces Its Strength,
Causes Damage
& Can Lead To Failure



Instead Use A
**TIE-OFF ADAPTOR /
CROSS-ARM STRAP**

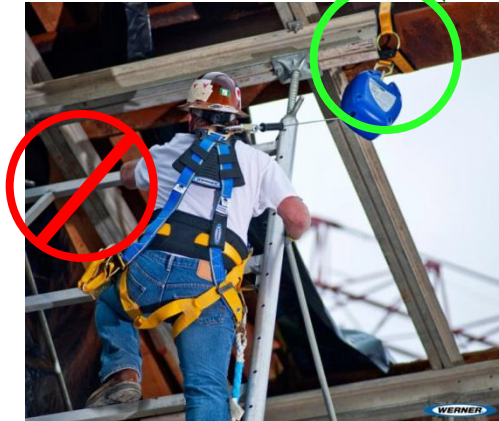
PERSONAL FALL ARREST CONNECTORS

Designed
Roof Anchor
Is Structural



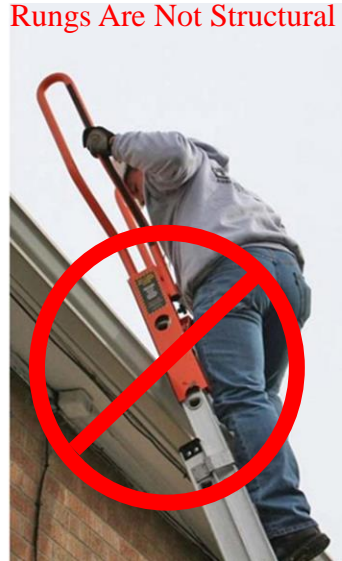
Conduits,
Pipes Or
Scaffold Are
Not Structural

I-Beam Is
Structural



Connect Lanyard
Snaphook
Onto An
Appropriate
Anchor

Fixed / Portable Ladder
Rungs Are Not Structural



Concrete
Anchor Is
Structural



Anchor Is Usually
Designed Only For
1 Worker



Guardrail Is Not Structural



FALL PROTECTION

SUSPENSION DEVICES

BOATSWAIN'S CHAIR (Seat Sling)

Suspends and Supports the User
while being Transported
Vertically and Horizontally along
a Vertical Work Surface

**Must be Used with
Separate Lifeline**



FALL PROTECTION

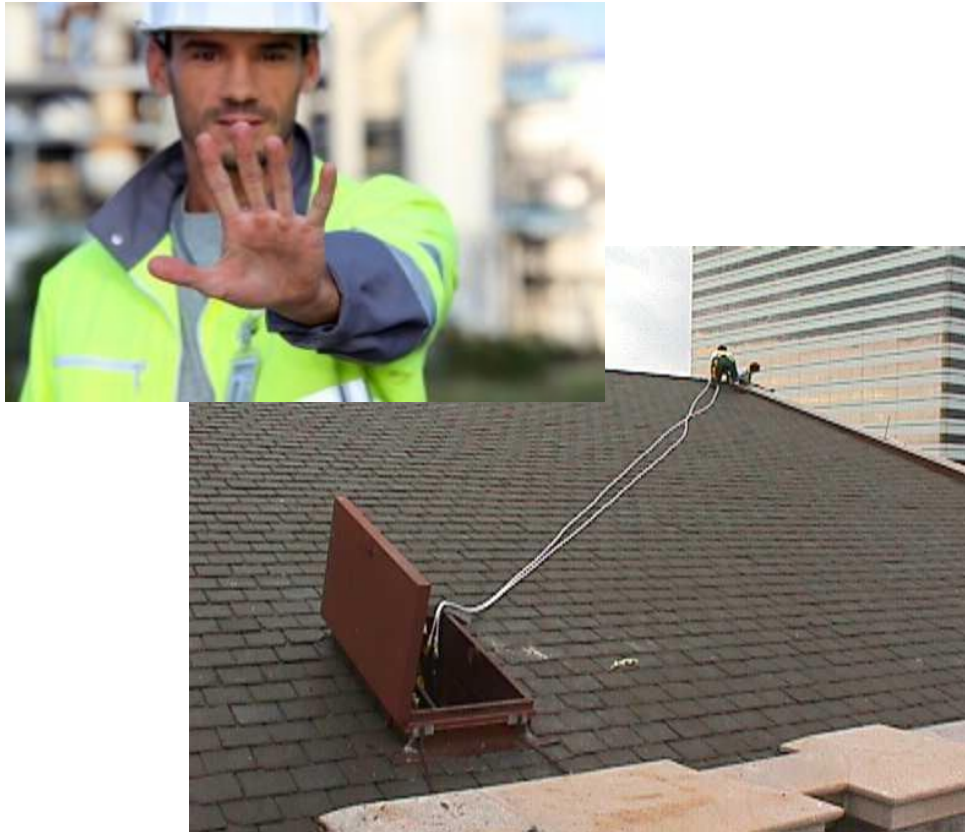
WARNING LINE



- No Protection Required Inside Warning Line
- No One Allowed Outside Of Line
- Ropes, Wires, Chains
 - 500 Lbs Strength
 - 16 Lbs Side Force
 - 39" High (Can Sag to 34")
 - High-Visibility Flags Every 6'
 - Around All Sides of Roof **6'** or More **From Edges**
 - **For Low Slope Roof Only**
 - Slope Less Than Or Equal To 4 In 12 (Vertical To Horizontal)

FALL PROTECTION

SAFETY MONITORING



COMPETENT PERSON

- Sole Job Is To Monitor Workers - Warn Of Potential Fall Hazards
- Allowed On Low Slope Roof
 - Along With Guardrail, Safety Net And/Or Fall Arrest Systems
- Can Be Used Alone For Roofs 50' Wide Or Less

FALL PROTECTION EQUIPMENT INSPECTION

BEFORE EVERY USE

Check For Signs Of Wear Or Damage



FALL PROTECTION EQUIPMENT INSPECTION



Webbing - Grasp The Webbing With Your Hands 6” - 8” Apart. Bend The Webbing In An Inverted “U” As Shown. The Surface Tension Resulting Makes Damaged Fibers Or Cuts Easier To Detect. Follow This Procedure The Entire Length Of The Webbing, Inspecting Both Sides Of Each Strap. Look For Frayed Edges, Broken Fibers, Pulled Stitches, Cuts, Burns And Chemical Damage.



D-rings/Back Pads - Check D-Rings For Distortion, Cracks, Breaks, And Rough Or Sharp Edges. The D-ring Should Pivot Freely. Inspect For Any Unusual Wear, Frayed Or Cut Fibers, Or Broken Stitching Of The D-ring Attachments. Pads Should Also Be Inspected For Cracks, Excessive Wear, Or Other Signs Of Damage.



Buckles - Inspect For Any Unusual Wear, Frayed Or Cut Fibers, Or Broken Stitching Of The Buckle Attachments.

FALL PROTECTION

EQUIPMENT INSPECTION



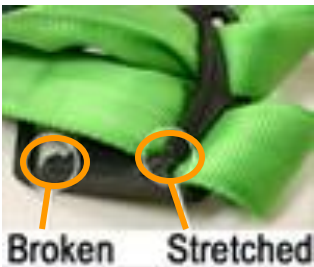
Tongue Buckles/Grommets - Buckle Tongues Should Be Free Of Distortion In Shape And Motion. They Should Overlap The Buckle Frame And Move Freely Back And Forth In Their Socket. Roller Should Turn Freely On Frame. Check For Distortion Or Sharp Edges. Inspect For Loose, Distorted Or Broken Grommets. Webbing Should Not Have Additional Punched Holes.



Friction And Mating Buckles - Inspect The Buckle For Distortion. The Outer Bars And Center Bars Must Be Straight. Pay Special Attention To Corners And Attachment Points At The Center Bar.



Quick-connect Buckles - Inspect The Buckle For Distortion. The Outer Bars And Center Bars Must Be Straight. Make Sure Dual-tab Release Mechanism Is Free Of Debris And Engages Properly.



Harness Fall Arrest Indicators - Inspect Fall Arrest Indicators (Located On The Back D-ring Pad) For Signs Of Activation. Remove From Service If Broken Or Stretched.

FALL PROTECTION EQUIPMENT INSPECTION



TAG & REMOVE From Service
Any Personal Fall Arrest Equipment

- **Damaged**
- **Involved In A Fall**

FALL PROTECTION

EQUIPMENT MAINTENANCE

Cleaning And Maintaining Fall Protection Gear Regularly

- Helps It Last Longer
- Less Likely To Fail

Things That Weaken Or Cause Equipment Failure:

- Grease, Dirt, Mildew, Heat, Prolonged Direct Sunlight & Chemicals

CLEANING

- Web / Rope Gear
 - Remove All Surface Dirt With A Damp Sponge
 - Do Not Soak
 - Wash With Mild Soap & Water
 - Do Not Use Chlorine, Bleach Or Abrasives
 - Hang To Air Dry
 - Do NOT Dry With Hot Air Blowers
- Body Harnesses - According To Manufacturer's Guidelines



Storage – Hang In A Cool, Dry, Clean & Dark Place Away From Direct Sunlight, Fumes or corrosive elements

PERSONAL FALL ARREST

PLANNING for a FALL

FACTORS

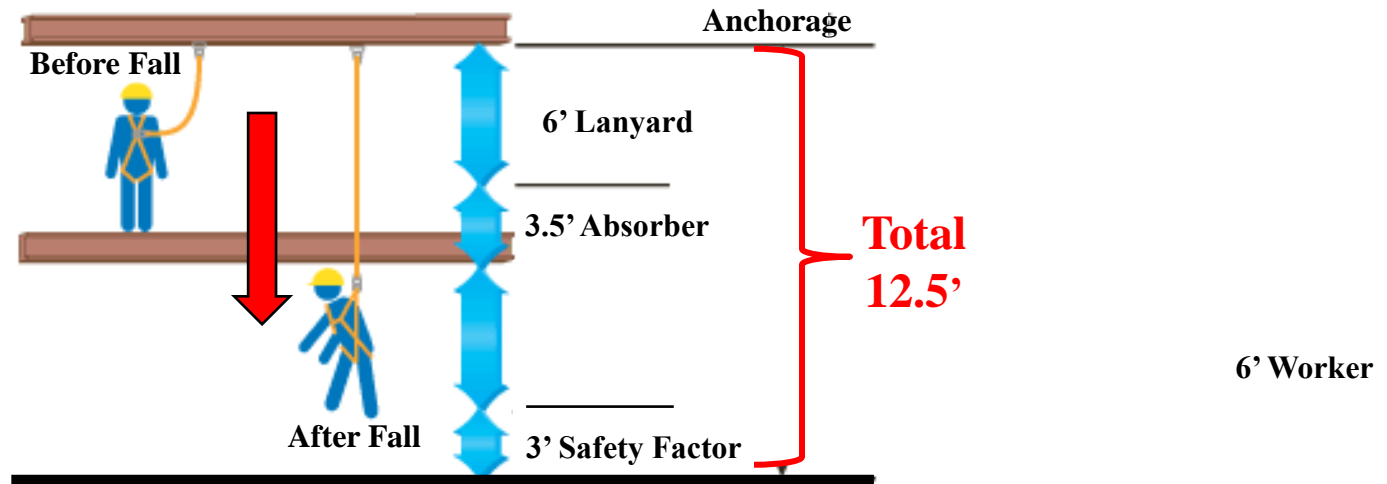
- **FALL DISTANCE** - Lanyard Length (6' Maximum)
+ / - Anchor Height
- **ANCHOR HEIGHT** - Distance the Harness D-Ring is Above / Below Anchor Point
- **DECELERATION DISTANCE** - How Far the Shock Absorber Extends; 3.5' Max
- **STRETCH** - Elasticity of Material (See Manufacturer's Information)
- **EMPLOYEE HEIGHT** - Height of D-Ring Above Work Surface
- **SWING** - Side Motion During Fall

Free Smartphone Application to calculate a safe fall protection clearance -

<http://itunes.apple.com/ca/app/peakworks-fall-clearance-calculator/id359065407?mt=8>

PERSONAL FALL ARREST

PLANNING for a FALL



Fall Calculation – Anchor Above Worker:

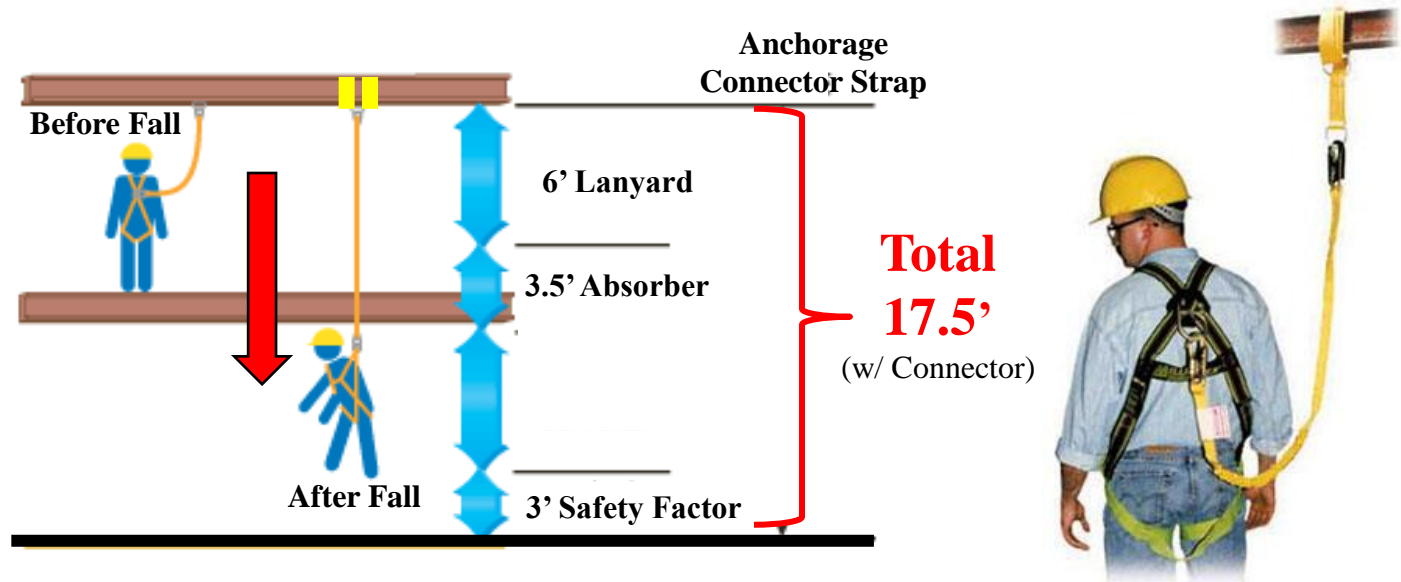
- ♦ 6' Length Of The Lanyard
- ♦ 3.5' Elongation Of The Shock Absorber During Deceleration
- ♦ 3' Safety Factor

12.5' TOTAL Fall Distance Needed

NOTE: If Your Anchor Is Above The Back D-Ring At Shoulder Blade Height
Your Fall Distance Will Be **LESS**

PERSONAL FALL ARREST

PLANNING for a FALL

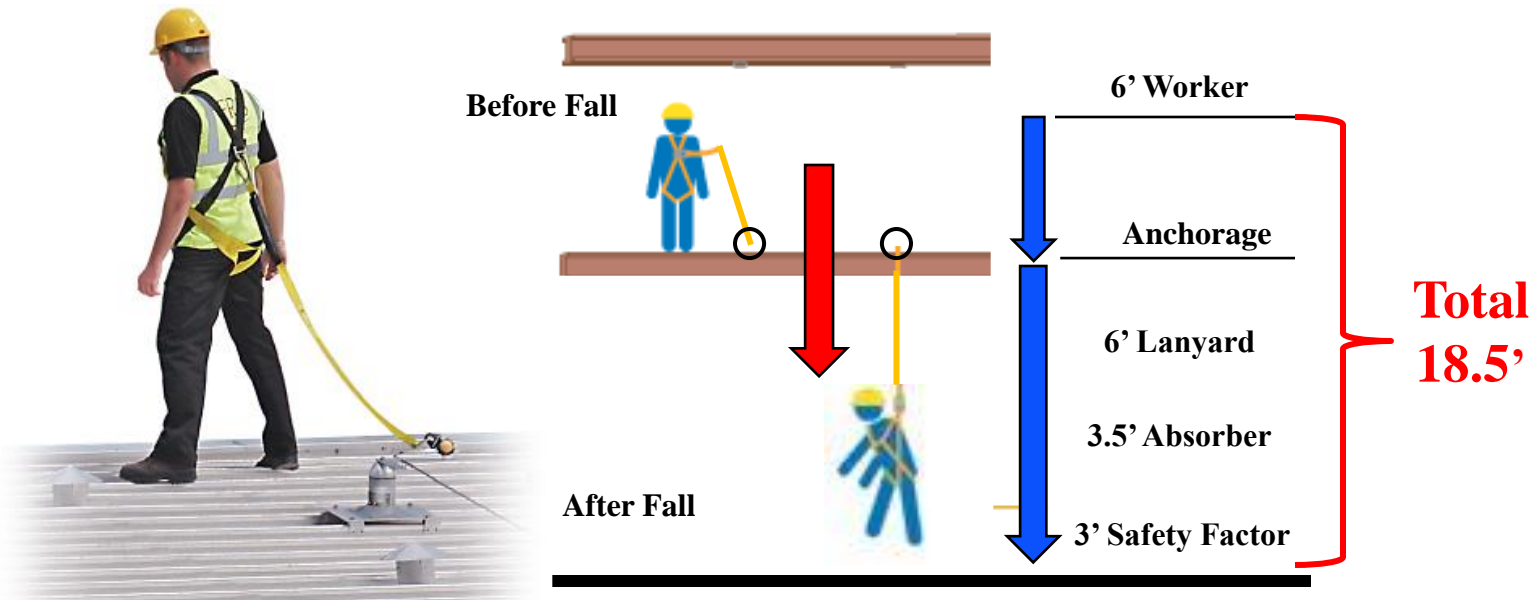


Fall Calculation – Using Cross-Arm Anchorage Connector

- ♦ 12.5' Fall Distance (From Previous Example)
 - ♦ 3 - 5' Length Of The Cross-Arm Anchorage Connector
-
- ♦ 17.5' **TOTAL Fall Distance Needed**

PERSONAL FALL ARREST

PLANNING for a FALL



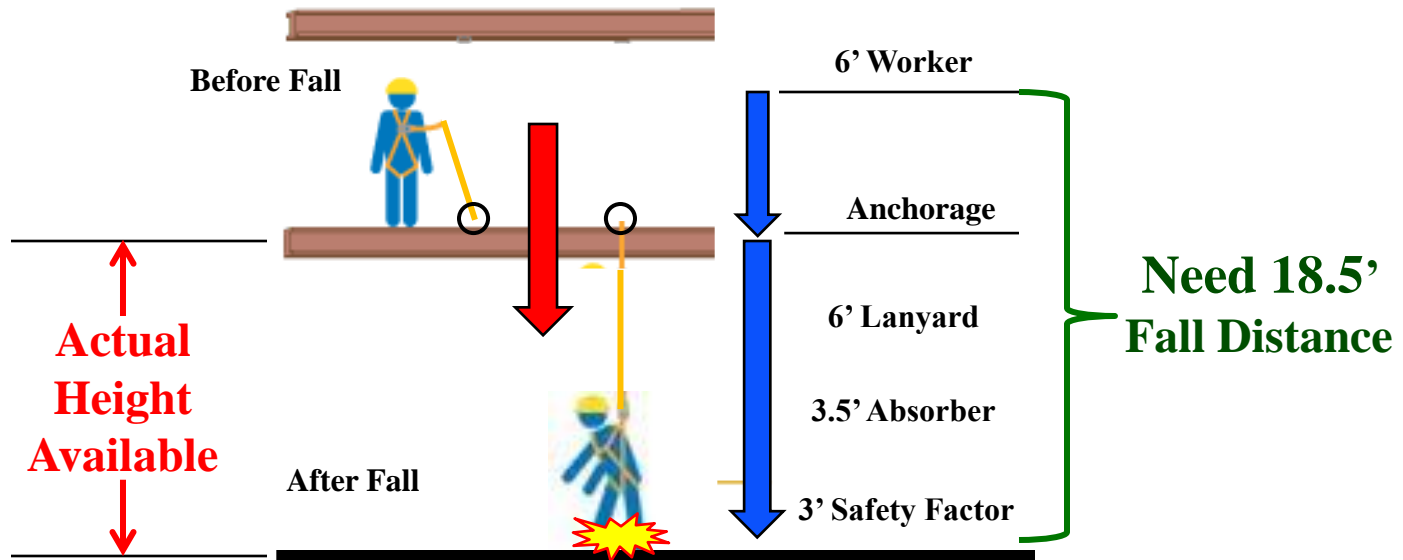
Fall Calculation – Anchor At Walk Surface (Below Worker)

- ♦ 6' Average Height Of Worker
- ♦ 6' Length Of The Lanyard
- ♦ 3.5' Elongation Of The Shock Absorber During Deceleration
- ♦ 3' Safety Factor

18.5' TOTAL Fall Distance Needed

PERSONAL FALL ARREST PLANNING for a FALL

Will You **HIT BELOW**???



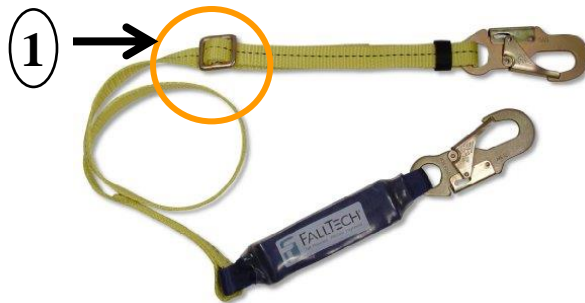
YES, If Your Anchor Height To Ground
(Object Below) Is Less Than The Needed Fall Distance!

PERSONAL FALL ARREST PLANNING for a FALL

Anchor Too Low & You'll Hit Below?

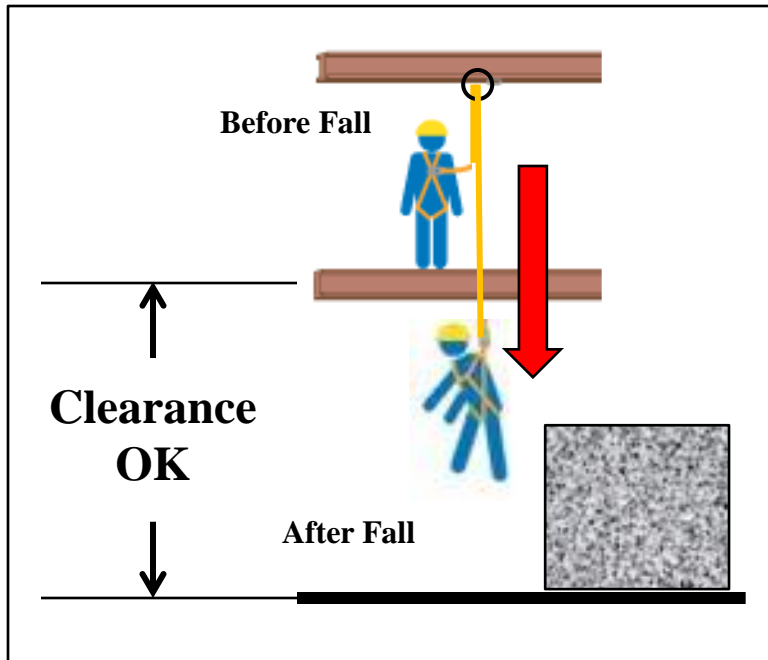
OPTIONS:

1. Shorten The Lanyard (If Adjustable)
2. Raise Your Anchor Point
 - Example: Use I-beam Attachment Overhead
3. Use A Self-retracting Lifeline
 - Stops Fall In 2' Or Less

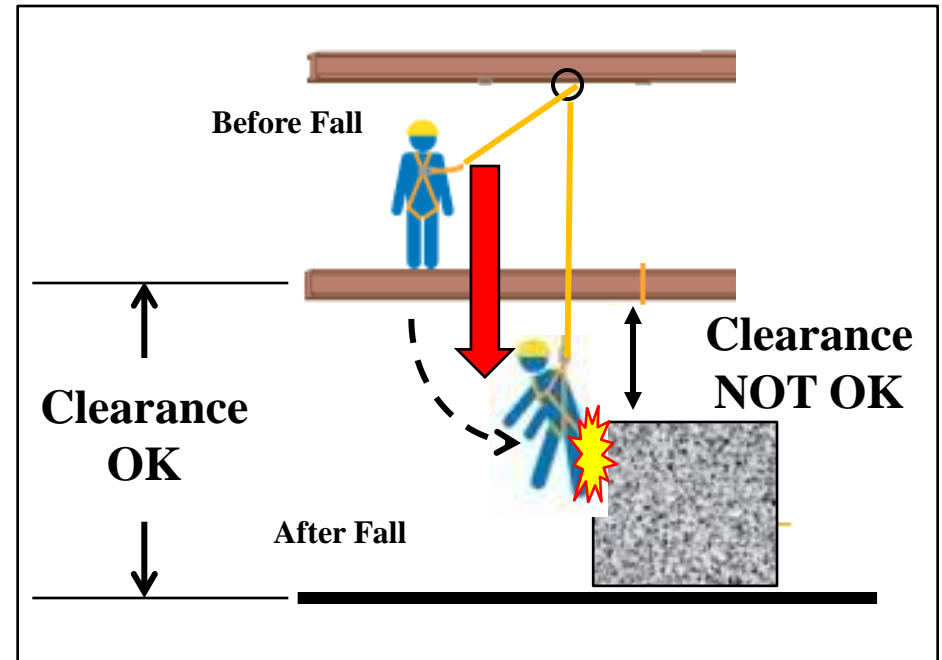


PERSONAL FALL ARREST PLANNING for a FALL

Will You **HIT BELOW**???



Fall When Anchor Is In Line
Is To Directly Below

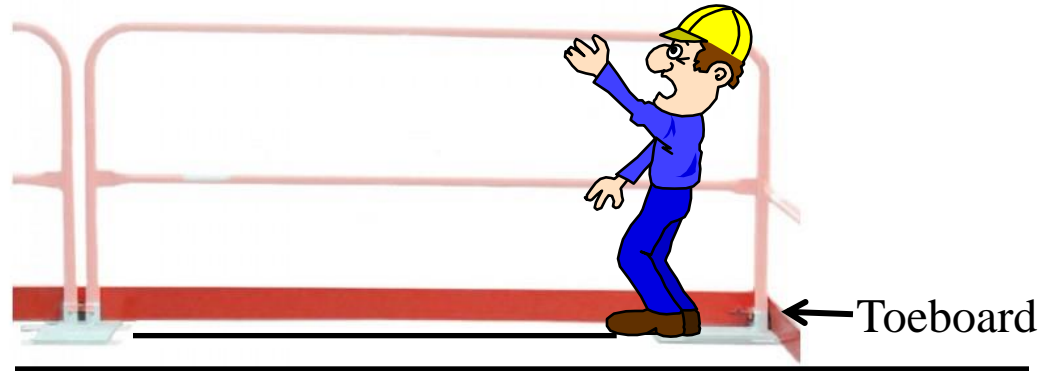


Can **Swing Into Object Below** When
Working Off To The Side Of Anchor

FALL PROTECTION

FALLING OBJECTS

- **Toeboards** - 3 1/2" Tall & 1/4" Gap Or Less Along Edge Of Overhead Work Surface To Prevent Falling Objects
- **Nets / Canopies** – To Catch Falling Objects
- **Hard Hats** To Protect Head From Dropped Object Strikes



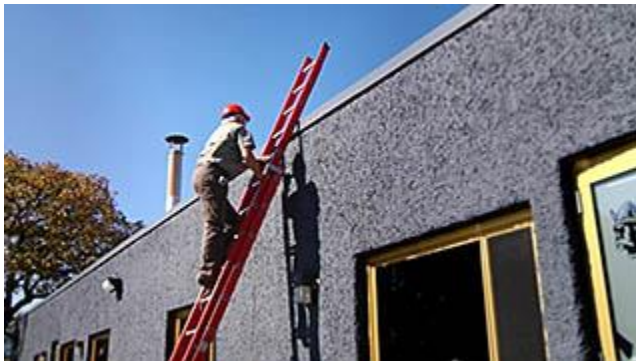
FALL PROTECTION

RESCUE / RETRIEVAL



RESCUE PLAN:

- Is Mechanical Assistance Available?
Example: Pre-Positioned:
 - Ladder
 - Boom Truck
 - Scaffolds
 - Rescue System
- Notify 9-1-1



Fall Arrest Rescue Pack



FALL PROTECTION RESCUE / RETRIEVAL

Hanging For Lengthy Time In Harness Leads To

SUSPENSION TRAUMA

(Orthostatic Hypertension)



- Unconscious In 5 - 20 Minutes Due To Cutting Off Of Blood Circulation And Oxygen To The Brain (Pools In The Legs)
- Loss Of Consciousness Or Fatality Due To Return of Pooled Hypoxic Blood And Metabolic Byproducts From The Legs To The Heart (Toxic Reflow)

DANGER Is To Those Unable To Move For More Than 4 Minutes
Could Die In 10 - 45 Minutes

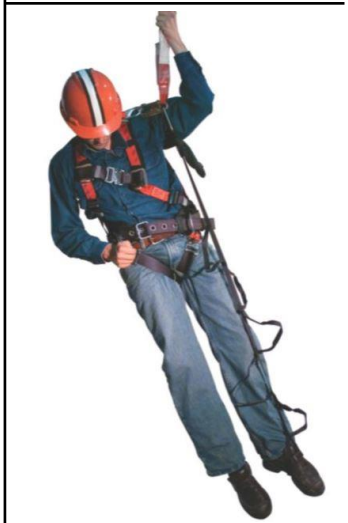
FALL PROTECTION RESCUE / RETRIEVAL

SUSPENSION TRAUMA SAFETY STRAP

Provides Means To Keep Blood Circulation

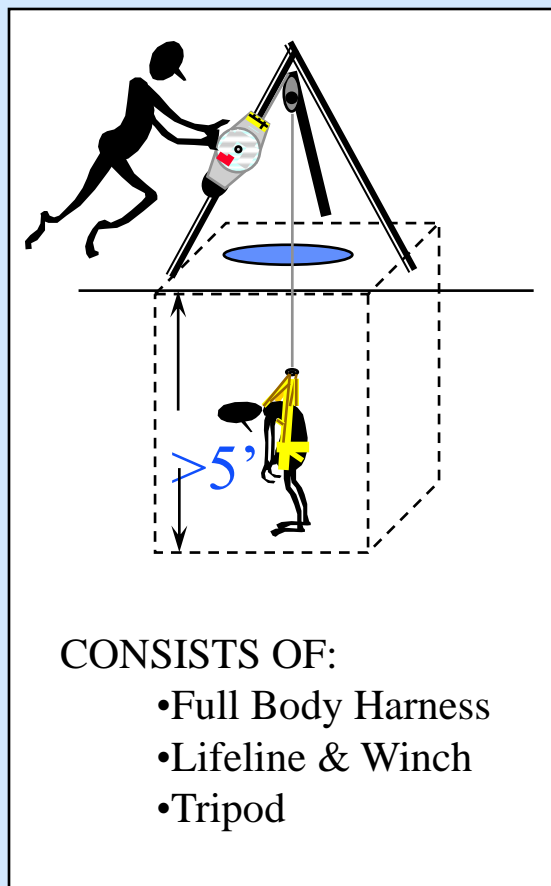


Examples Of Suspension
Trauma Straps



Once Rescued Stay Seated On The Ground For 30 Minutes
(Helps Prevent Toxic Reflow)

FALL PROTECTION CONFINED SPACE Rescue System



A SYSTEM IN AN EMERGENCY:

- Lowers / Raises a User to Safety
- Prevents Free Fall but May or May Not Provide Fall Arrest
- Mechanically Assists Retraction (Required) When Space is $> 5'$ Deep



Vehicle-Mounted, Elevating and Rotating Work Platforms

- Restraint shall be worn with lanyard attached to the boom/basket
 - Keeps the Employee From Being Bounced Out
- Tying off to an adjacent pole or structure is not permitted
- Set Brakes
- Position Outriggers
- Install Wheel Chocks on an Incline
- Do Not Move Truck When the Boom is Elevated with Men in the Basket
- Emergency Override Controls at Ground Level



Vehicle-Mounted, Elevating and Rotating Work Platforms

Required Information:

- Normal Operating Instructions
- Special/Emergency Instructions, Cautions & Restrictions
- Clearly Marked Controls
- Workload Capacities
- Statement If Platform Is Electrically Insulated or Not



Fall Protection



Questions?



Contact Your **Supervisor**
Or
Call The **Safety** Office
@ 737-2311

General Services Division
Facilities Management

Fall Protection

Course Exam

Remember



To Receive Credit For This Course
Turn In Your Completed Test To The
Safety Office

Passing Grade is **70%** Or Better



The
End